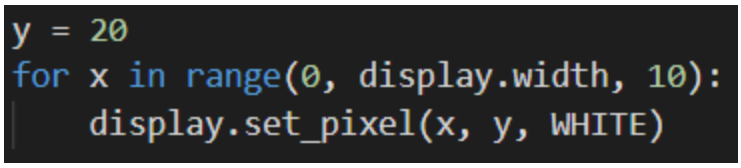
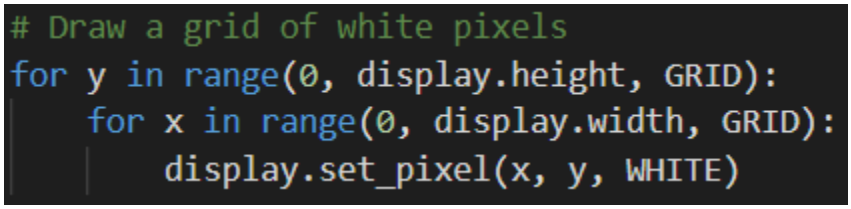
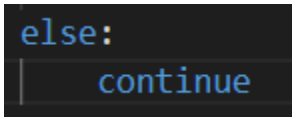
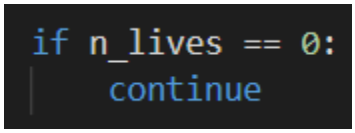
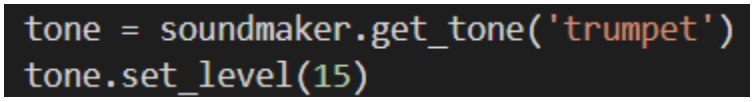
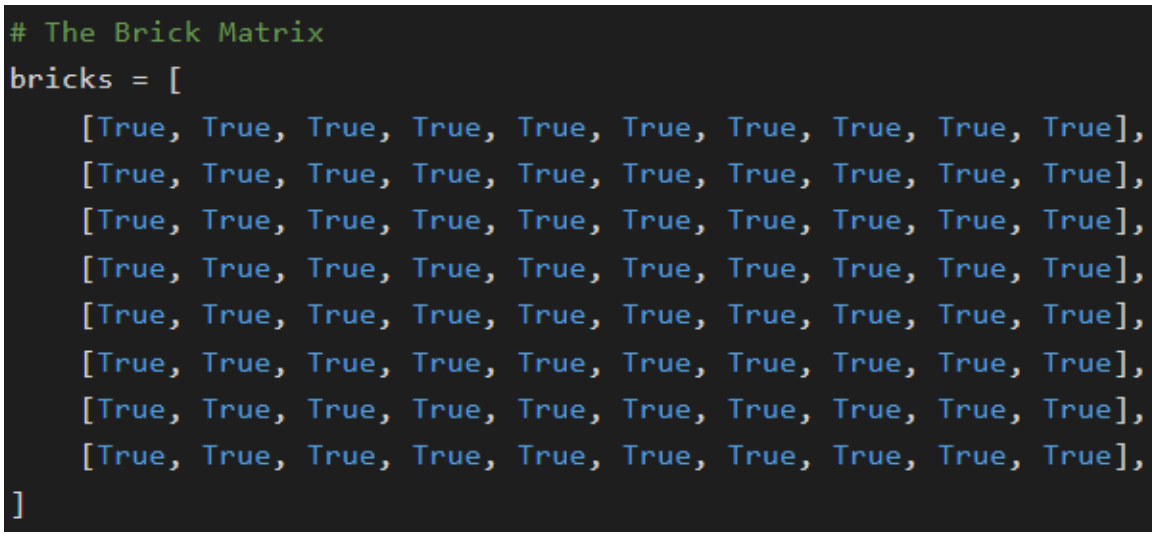
AP CSP Python Code – Missions beyond 9

Mission 3 Remix	
Clear the display	`display.fill(BLACK)`
Clear a NeoPixel (turn black)	`pixels.set(0, BLACK)`
Import random module	`from random import randrange`
Assign a random color (RGB)	`red = randrange(256)` `green = randrange(256)` `blue = randrange(256)`
Assign color from RGB	`color = (red, green, blue)`
Use color variable	`pixels.set(0, color)`
Mission 6 Remix	
Play a tone	`audio.pitch(my_sound, 0.5)` `audio.pitch(520, delay)`
Mission 7 Remix	
Print on multiple lines	Use "\n" and display.print() `display.print("Hello \nthere")` will print hello there
Turn on/off LED above button A/B	`leds.set(LED_A, True)` `leds.set(LED_B, False)`
Mission 10 - Reaction Tester	
Turn off all pixels using a list	`pixels.set([BLACK, BLACK, BLACK, BLACK])`
Turn all pixels a color using a list	`pixels.set([GREEN, GREEN, GREEN, GREEN])`
Clear the display	`display.clear()`

Get current clock time	`start_time = time.ticks_ms()`
Find the difference between two clock times	`reaction_time = time.ticks_diff(end_time, start_time)`
Reset the button state	`buttons.was_pressed(BTN_A)`
Mission 11 - Spirit Level	
Math module	`import math` used for math operations, like math.pi, math.asin, etc.
Get values from the accelerometer	`val = accel.read()`
Get a single value from the accelerometer	`val = accel.read()` `tilt_x = val[0]`
Change display color	`display.fill(WHITE)`
Draw a line	`display.draw_line(x1, y1, x2, y2, color)` `display.draw_line(CENTER, 0, CENTER, 105, BLACK)`
Draw a circle	`display.draw_circle(x, y, radius, color)` `display.draw_circle(x, CENTER, 15, ORANGE)`
Mission 11 Remix -- these commands are optional but can be used in the remix projects	
Filled in circle	`display.fill_circle(CENTER, CENTER, 15, RED)`
Display text with a specific location	`display.draw_text(str(score), x=20, y=20, scale=3, color=BLACK)`
Mission 12 - Night Light	
Read from the light sensor	`value = light.read()`
Set all pixels the same color	`pixels.fill(WHITE)` -- on `pixels.fill(BLACK)` -- off
Adjust brightness of pixels	`pixels.fill(WHITE, brightness=20)`

	`pixels.fill(WHITE, brightness = level)`
Mission 13 - Sounds Fun	
Draw a rectangle	`display.draw_rect(0, 80, 240, 40, GRAY)` `display.fill_rect(0, menu_y[prev_sel], 240, 40, BLACK)`
Draw text (different from display.print)	`display.draw_text("MUSIC", x=20, y=90, color=WHITE, scale=3)` Parameters are optional: x, y, color, scale (and can be listed in any order)
max and min functions	Returns the largest or smallest item included in parenthesis (arguments) `max(menu_index - 1, 0)` `menu_index = min(menu_index + 1, 3)` usually part of an assignment
Import soundlib module	`from soundlib import *`
Get a tone from the soundmaker	`trumpet = soundmaker.get_tone('trumpet')` You can have up to 16 tones playing at the same time.
Set the pitch of a tone and “turn on” play.	`siren.set_pitch(440)` `siren.play()`
Stop playing a tone	`sleep(1.5)` `siren.stop()`
For loop	`trumpet.set_pitch(440)` `for i in range(4):` `    trumpet.play()` `    sleep(0.1)` `    trumpet.stop()` `    sleep(0.1)` i is the loop control variable, incrementing from 0 to 3.
Not operator Used to toggle	Flips the state of a variable (True to False or False to True) `global is_playing` `is_playing = not is_playing`

Non-blocking function for playing an mp3	`race_music = soundmaker.get_mp3('sounds/funk.mp3')` `race_music = soundmaker.get_mp3('sounds/funk.mp3', play=False)` add a parameter so the music does not automatically start
Use a for loop while playing a sound (uses a nested for loop)	```trumpet.play() for freq1 in range(500, 1500, 100): for freq2 in range(freq1, freq1+1000, 100): trumpet.set_pitch(freq2) sleep(0.023)``` The inner loop takes the current frequency and increases it for a sweeping sound. This is repeated 10 times (outer loop) by changing the frequency by 100 each time.
Glide from soundlib	Glide takes two arguments: new (or ending) pitch and duration. It is a non-blocking function. ```siren.set_pitch(440) siren.play() siren.glide(880, 1.5)```
Mission 14 - Line Art	
Turn on a single pixel in a color	`display.set_pixel(50, 120, WHITE)`
Return the color of a single pixel	`display.get_pixel(120, 120)` returns a tuple of the color at the given location
Functions that return the display width and height	```display.width display.height```
Convert a value to an integer	```# Variables for screen center x_center = int(display.width / 2) y_center = int(display.height / 2)``` use the **int()** function
For loop that draws a straight line of pixels	```for x in range(display.width): display.set_pixel(x, y_center, RED)``` - horizontal line ```for y in range(display.height): display.set_pixel(x_center, y, RED)``` - vertical line

Step parameter of a for loop	 the step is like “skip” counting, or what it changes the loop control variable by each time it loops. In this case, the loop counts by 10.
Nested for loops (will draw a grid)	 GRID is a constant for the “step” of the for loop.
Mission 15 - Handball	
continue	Jumps back to the top of the while loop instead of going to the next sequential step  can only be used inside a loop  skips the rest of the game loop if no lives are left
Adjust the volume of a sound effect	
Mission 16 - Breakout	
A list of lists (matrix)	

```
y = 20
for x in range(0, display.width, 10):
    display.set_pixel(x, y, WHITE)
```

```
# Draw a grid of white pixels
for y in range(0, display.height, GRID):
    for x in range(0, display.width, GRID):
        display.set_pixel(x, y, WHITE)
```

```
else:
    continue
```

```
if n_lives == 0:
    continue
```

```
tone = soundmaker.get_tone('trumpet')
tone.set_level(15)
```

```
# The Brick Matrix
bricks = [
    [True, True, True, True, True, True, True, True, True, True],
    [True, True, True, True, True, True, True, True, True, True],
    [True, True, True, True, True, True, True, True, True, True],
    [True, True, True, True, True, True, True, True, True, True],
    [True, True, True, True, True, True, True, True, True, True],
    [True, True, True, True, True, True, True, True, True, True],
    [True, True, True, True, True, True, True, True, True, True],
    [True, True, True, True, True, True, True, True, True, True],
]
```

	`` def setup_bricks(): global bricks bricks = [] for i in range(BRICKS_DOWN): bricks.append([]) for j in range(BRICKS_ACROSS): bricks[i].append(True) ``` code for creating the list of lists: i is the rows, j is the columns
Not operator (review from Mission 13)	`mute = not mute` Toggle a Boolean variable
Turn on a red LED above a button (review from Mission 7)	`leds.set(LED_A, mute)` mute is a Boolean (True or False)